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| EXAMINER |
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COLE, ELIZABETH M

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| ART UNIT | PAPER NUMBER |
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1794

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11/10/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/821,175 | <b>Applicant(s)</b><br>NOGUCHI ET AL. |  |
|                              | <b>Examiner</b><br>Elizabeth M. Cole | <b>Art Unit</b><br>1794               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 25 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 11-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 23-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/25/08 has been entered.

2. Claims 5, 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Independent claim 1 recites that the elastomer in the composite material is in its uncrosslinked form but dependent claim 5 recites that the elastomer in the composite material is in its crosslinked form. Independent claim 8 recites that the elastomer in the composite material is in its crosslinked form but dependent claim 25 recites that the elastomer in the composite material is in its uncrosslinked form. The two dependent claims are indefinite since they recite that the elastomer is in a state which is different from what is recited in the independent claim.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-10, 23-29, rejected under 35 U.S.C. 103(a) as being unpatentable over WO 03/06002 in view of Brennan et al, U.S. Patent No. 5,844,523. WO '002 discloses

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a material comprising an elastomer such as natural rubber, synthetic rubbers based on diene polymers such as polybutadiene, styrene-butadiene, polyisoprene rubber, etc., nitrile rubber, silicone rubber, neoprene rubber, urethane rubber, etc. See page 4, lines 19-26. WO '002 teaches that carbon nanotubes can be mixed with the elastomer.

Since the elastomers disclosed comprise an unsaturated bond or group, the elastomers would necessarily have the claimed affinity to the carbon nanofibers and the claimed molecular weights. WO '002 does not disclose the claimed spin-spin relaxation time of the network components as measured by the Hahn-echo method using pulsed NMR techniques, however, since the same materials are employed and the same results are obtained, it is reasonable to presume that the materials of WO '002 would have the claimed spin-spin relaxation time. WO '002 teaches the addition of surfactants in order to provide for uniform distribution of the carbon nanotubes in the rubber. See page 5.

WO '002 teaches the same elastomeric materials having the same unsaturated bond groups and teaches that the carbon nanotubes have an affinity for the elastomers. See page 5. WO '002 does not state that the elastomer should be crosslinked or uncrosslinked. However, WO '002's examples include vulcanized, (i.e., crosslinked) elastomers. Brennan et al teaches that elastomers such as rubbers into which filler such as fibers can be dispersed can be either crosslinked or uncrosslinked. See col. 7, line 65 – col. 8, line 10. Therefore, since WO'002 is silent as to whether crosslinked or uncrosslinked elastomers are employed and Brennan teaches that both crosslinked and uncrosslinked elastomers are suitable for use to form composite materials into which fillers such as fibers are mixed, one of ordinary skill in the art at the time the invention

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was made would have been motivated to have employed either crosslinked or uncrosslinked elastomers as the elastomer resin component taught by WO '002 because Brennan et al teaches that both types of elastomers can be used in such composite materials.

6. Claims 1-10, 23-29 are rejected under 35 U.S.C. 103(a) as obvious over Fisher et al, U.S. Patent No. 6,203,814 in view of Brennan et al, U.S. Patent NO. 5,844,523. Fisher discloses a composite material comprising carbon nanofibers having a diameter of less than 0.5u, (col. 4, lines 45-46), which can be dispersed in an elastomer such as natural rubber, styrene-butadiene rubber or polybutadiene, (col. 7, lines 1-9). Since the elastomers disclosed comprise an unsaturated bond or group, the elastomers would necessarily have the claimed affinity to the carbon nanofibers and the claimed molecular weights. Fisher discloses that there is an affinity between the nanofibers and the elastomers. See abstract. Fisher does not disclose the claimed spin-spin relaxation time of the network components as measured by the Hahn-echo method using pulsed NMR techniques, however, since the same materials are employed and the same results are obtained, it is reasonable to presume that the materials of Fisher would have the claimed spin-spin relaxation time. Also, Fisher teaches that the functionalized carbon fibrils are better dispersed into polymer systems, including elastomers, in theory, because the modified surface properties of the fibrils are more compatible with the polymer, or because the modified functional groups, particularly hydroxyl or amine groups are bonded directly to the polymer as terminal groups. Therefore, Fisher is teaching that dispersion of the fibrils is a result effective variable with is related to the

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surface properties of the modified fibers and/or to the compatibility of the matrix polymer with the functional groups. Therefore, the person of ordinary skill in the art would have been able to select the functional groups of the modified fibrils in order to arrive at fibrils which would be best able to be dispersed in the polymer systems. The elastomer is not disclosed as being crosslinked or uncrosslinked, but instead the reference is silent as to this feature. Brennan et al teaches that elastomers such as rubbers into which filler such as fibers can be dispersed can be either crosslinked or uncrosslinked. See col. 7, line 65 – col. 8, line 10. Therefore, since Fisher et al is silent as to whether crosslinked or uncrosslinked elastomers are employed and Brennan teaches that both crosslinked and uncrosslinked elastomers are suitable for use to form composite materials into which fillers such as fibers are mixed, one of ordinary skill in the art at the time the invention was made would have been motivated to have employed either crosslinked or uncrosslinked elastomers as the elastomer resin component taught by Fisher et al because Brennan et al teaches that both types of elastomers can be used in such composite materials. With regard to the amendment reciting that the fibers are substantially uniformly dispersed, Fisher teaches at col. 7, lines 10-18 that carbon fibers are easily dispersed in the elastomer composition.

7. The Declaration under 37 CFR 1.132 filed 8/25/08 is insufficient to overcome the rejection of claims based upon Fisher as set forth in the last Office action because:

8. It states that the claimed subject matter solved a problem that was long standing in the art. However, there is no showing that others of ordinary skill in the art were working on the problem and if so, for how long. In addition, there is no evidence that if

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persons skilled in the art who were presumably working on the problem knew of the teachings of the above cited references, they would still be unable to solve the problem. See MPEP § 716.04. The Declaration states that there was a long felt need, but does not present evidence to support this. Further, the Declaration does not establish how long others of ordinary skill in the art were working on the problem other than saying there had been repeated attempts. The Declaration does not present evidence that if person skill in the art who were presumably working on the problem knew of the teachings of Fisher and the newly cited WO '002 reference that they would still be unable to solve the problem. Further, the newly cited WO '002 reference teaches fiber amounts of 0.1-150% at page 6, lines 1-3. Therefore, it has not been established that high amounts of fibers were previously necessary to form the composite material. It is noted that establishing long-felt need requires objective evidence that an art recognized problem existed in the art of a long period of time without solution. There is no evidence presented establishing this. Further, no evidence has been presented of prior unsuccessful attempts to solve the problem, especially since it has not yet been established that there was art recognized problem for a long period of time. Additionally, it must be established that no one else solved the problem before the applicant. In the instant case, Fisher discloses a composition wherein the carbon nanofibers are easily dispersed in the elastomer composition and WO '003 states that invention provides a method of achieving uniform distribution of the nanofibers in the elastomer composition, (see page 5). Further, other facts such as lack of interest or lack of an appreciation of an invention's potential or marketability must be considered in

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determining the reasons for a failure to solve a long-felt need. The instant Declaration does not provide evidence as to these factors.

9. Applicant's arguments filed 8/25/08 have been fully considered but they are not persuasive. Applicant argues that the Declaration establishes that the claimed invention meets a long felt need. However, the Declaration is not persuasive for the reasons set forth above.

10. Further, Applicant states that the fact that Fisher states that a uniform dispersion of the nanofibers was desirable is an establishment of a long felt need. However, Fisher states that it provides a composition wherein the carbon fibers are easily dispersed in the elastomer composition. Therefore, Fisher is not establishing that there is a long felt need since it does not include any time periods. Further, the reference clearly teaches a structure in which the carbon fibers are easily dispersed in the elastomer.

11. Applicant argues that previously in order to ensure that the entire composite material comprised the nanofibers that high amounts of fiber would have to be used, which was expensive. However, WO '002 teaches using amounts of 0.1-150 wt%.

12. Applicant states that despite the long felt need that those in the field were unable to achieve uniform dispersion of carbon nanofiber in a matrix material. However, this statement is not supported by evidence.

13. Applicant states that the Declaration states that the invention was praised by authorities and experts and was granted a Japanese patent. However, Applicant has



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not established that the criteria employed in the expert's evaluation of these invention is the same as or similar to that employed in determining patentability before the US PTO.

14. Applicant argues that if a reference teaches that two variables are disclosed in the art as being variables which can be modified in order to achieve a particular result then that teaching has to be disregarded since only a single variable can be a result effective variable. However, MPEP 2144.04 (II)B is discussing the requirements which must be met before a variable can be said to be a result effective variable. It is not stating that only a single parameter can be a result effective variable, but is instead stating that the art must recognize the parameter as a result effective variable before it can be said that the parameter can be optimized. In the instant case, Fisher clearly teaches that the dispersion of the carbon fibers is directly related to the modified surface properties because the modified fibers are more compatible with the polymer or because the modified functional groups are bonded directly to the polymers, thus making them easier to disperse. Therefore, Fisher is teaching that by functionalizing the fibers, they disperse more easily in the matrix material due to the interaction between the modified fibers and the matrix material. This is a teaching that the functional group which modifies the fibers will improve their dispersion through the matrix material and therefore, the person of ordinary skill in would have been able to select the functional groups and matrix materials through the process of routine experimentation which produced the most dispersed final product. Applicant states that this goes beyond the level of routine experimentation, but does not state why. Fisher provides a variety of functional groups and a variety of matrix materials. From within the

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group provided by Fisher, the person of ordinary skill in the art would have been able to select the appropriate combinations through routine experimentation.

15. Applicant argues that Fisher does not result in a substantially uniform dispersion.

In support of this Applicant states that the spin spin relaxation times recited are not inherent to the materials, and thus, that even though Fisher discloses employing the identical rubbers and elastomers that they will not have the same spin spin relaxation times. However, Applicant has not presented evidence which supports this statement.

“The arguments of counsel cannot take the place of evidence in the record. *In re Schulze*, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965).” There is currently nothing on the record which establishes whether the spin spin relaxation time is an inherent property of the material or not. In the absence of such evidence, it will be presumed that like materials have like properties. Fisher discloses the same elastomers and therefore it is reasonable to presume that the elastomers would have the same properties such as the spin spin relaxation time.

16. Applicant argues that using too much fiber will not produce the claimed spin spin relaxation times. However, the claims do not recite a particular amount of fiber.

17. With regard to the potential 112 1<sup>st</sup> paragraph rejection, no rejection is set forth in the action at this time.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth M. Cole whose telephone number is (571) 272-1475. The examiner may be reached between 6:30 AM and 6:00 PM Monday through Wednesday, and 6:30 AM and 2 PM on Thursday.

The examiner's supervisor Rena Dye may be reached at (571) 272-3186.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

The fax number for all official faxes is (571) 273-8300.

/Elizabeth M. Cole/  
Primary Examiner, Art Unit 1794

e.m.c